New York Water Science Center, Strategic Science Plan, 2005-2010:

HYDROLOGIC SYSTEMS, SURVEILLANCE, AND HAZARDS

The U.S. Geological Survey has the principal responsibility within the Federal Government to provide the hydrologic information and understanding needed by others to achieve the best use and management of the Nation's water resources. Part of this mission includes the responsibility of minimizing the loss of life and property from natural disasters such as floods and droughts.

The USGS New York Water Science Center (the Center or WSC) will work to maintain its leadership in providing water-resources information for the State and Nation. The quality of the hydrologic information provided by the Center will be the standard to which others are compared. The Center will strive to be on the forefront of hydrologic research and related technical capabilities – always moving forward, never standing still.

"We have an unknown distance yet to run, an unknown river to explore." (John Wesley Powell)

A foundation of USGS water-resource information is the long-term hydrologic data collection and surveillance networks. In New York, the USGS operates (in 2005) a network of 374 surface-water-monitoring sites, 236 of which have their data transmitted in near real time to be available on the web (fig 1). A subset of these sites includes some form of water quality from simple water temperature to regular sampling for laboratory analyses of constituents. The USGS operates a ground-water-monitoring network of 291 sites, 27 of which have their data transmitted in near real time (fig 2). The majority of our ground-water network is focused on Long Island. In addition to the regular network, once a year water levels are measured at an additional 329 sites on Long Island to develop water-elevation maps for resource managers.

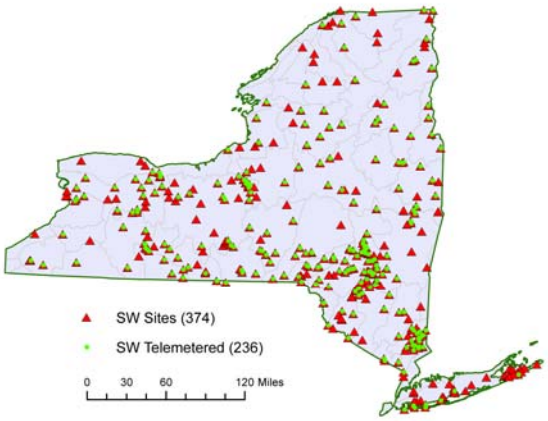

Figure 1.—Surface-water monitoring network (2005), showing sites with data telemetered in near real time.

Floods are the single most costly and life threatening natural disaster in New York and the Nation. Data from these surveillance networks, including a network of tide-surge warning stations on Long Island, are used to monitor flood conditions. The National Weather Service uses streamflow data from this network in their forecast models to provide flood warnings and alerts. In addition, data from these networks are used to monitor hydrologic conditions; this is of particular value during droughts. These long-term data are critical to State, local, and Federal officials in order to understand and manage water availability and use. Other uses of these data include: power generation, habitat and wildlife protection, navigation, recreation, and many more.

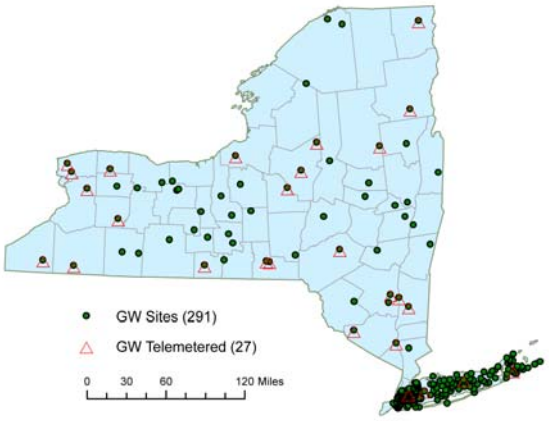

Figure 2. – Ground-water monitoring network (2005), showing sites with data telemetered in near real time.

Program Plans, Goals, and Actions

- The Center will look for opportunities to reduce the hazards associated with data-collection activities. Operation and maintenance of these networks includes measuring streamflow during floods, making ice measurements on frozen rivers (fig. 3), working in all extremes of weather conditions, working along roadways including lane closures and traffic control. Safety is our number one priority, safety for the public and safety for our employees. Advancements in acoustic technologies and other opportunities to use measurement methods that keep our personnel out of the water, off the ice, and out of roadways will be adopted where feasible and appropriate.

- Equally as important as safety, is providing the kinds of information our customers and stakeholders need, when and how they need it. The results of the strategic questionnaire (see inset) were loud and clear; keeping the data up and accurate on the web is of principle importance. The New York WSC will use the tools available to monitor the real-time data on the web and make sure that it is accessible and accurate. The Center will expand its use of the mirrored system of national servers and the RTweb software to assure that computer or internet problems at one site do not affect availability of the data. The Center will maintain contingency operations at other sites should the New York servers fail for an extended period of time. At the same time, the Center will explore new ways to enhance the accessibility and presentation of the data on the web.

In early 2005, the New York Water Science Center used a questionnaire and face-to-face meetings with many of our cooperators, as well as USGS employees, to get feedback on what environmental and resource-management issues they expect to see in the future, how the USGS can help to address these issues, and how the USGS can improve the way we provide information and project results. This plan incorporates many of these suggestions.

- **All of these efforts are moot if there are not sufficient funds to support the operations.** A major focus of the USGS must be to reduce the cost of operation by evaluating how we currently collect and process the data; by evaluating workforce, supplies, and support needs; and by identifying and implementing efficiencies. This is a critical need and must be considered as a part of all strategic actions. Both Federal and State funds are expected to decline over the next several years. Many of the strategic planning questionnaire responses pointed to the high cost of network operations and the cooperator's inability to continue to cover annual increases in these costs.

- The Center will work with cooperators to identify areas where the Center can enhance operations to help safeguard water supplies from both accidental and intentional contamination. One example of this may be to add water quality monitoring to some key sites to help identify possible contaminants. Another example might be to develop models to provide time-of-travel estimates for the movement of contaminants in NY streams.

- The Center will work with cooperators to add more water-quality monitoring at existing surface- and ground-water sites. This was a recurring theme in many of the questionnaire responses. In particular, there was interest in identifying less expensive surrogates that could be an indicator of other contamination but could be monitored continuously – for example turbidity may be an indicator of PCB loads in some locations, specific conductance can be an indicator or salt-water intrusion.

Figure 3.—USGS employees making a streamflow measurement through the ice.

- On Long-Island salt-water intrusion is a major issue in several areas. Ground-water is the sole source of water supply on the Island. In some areas water supply wells have been shut down due to salt-water intrusion. The Center will work with cooperators to find funding to support the installation and instrumentation of outpost wells that can provide a management tool for water suppliers by making them aware of salt-water intrusion up gradient of their supply wells before it reaches their well.

These are a small subset of the goals to improve the availability of hydrologic information to address resource management needs while helping to reduce the economic and human cost of natural disasters. A brief description of all projects currently being conducted by the WSC can be found on the web at http://ny.usgs.gov. If you would like to provide additional suggestions for improvement, please contact: Rafael W. Rodriguez, Director, USGS New York Water Science Center, (518) 285-5659 or email: dc_ny@usgs.gov